Inflation and Time Inconsistency

($\pi^* = 0$)

Central bank

	$\pi = 0$	$\pi = \pi^D$
$\pi^{exp} = 0$	*Coop solution* $Y = Y_n$ $L = L^C$	Discretion $Y_n < Y < kY_n$ $L = L^D$
$\pi^{exp} = \pi^D = \pi^{RE}$		Rational exp equil $\mathrm{Y} = \mathrm{Y}_\mathrm{n}$ $L = L^{RE}$

workers

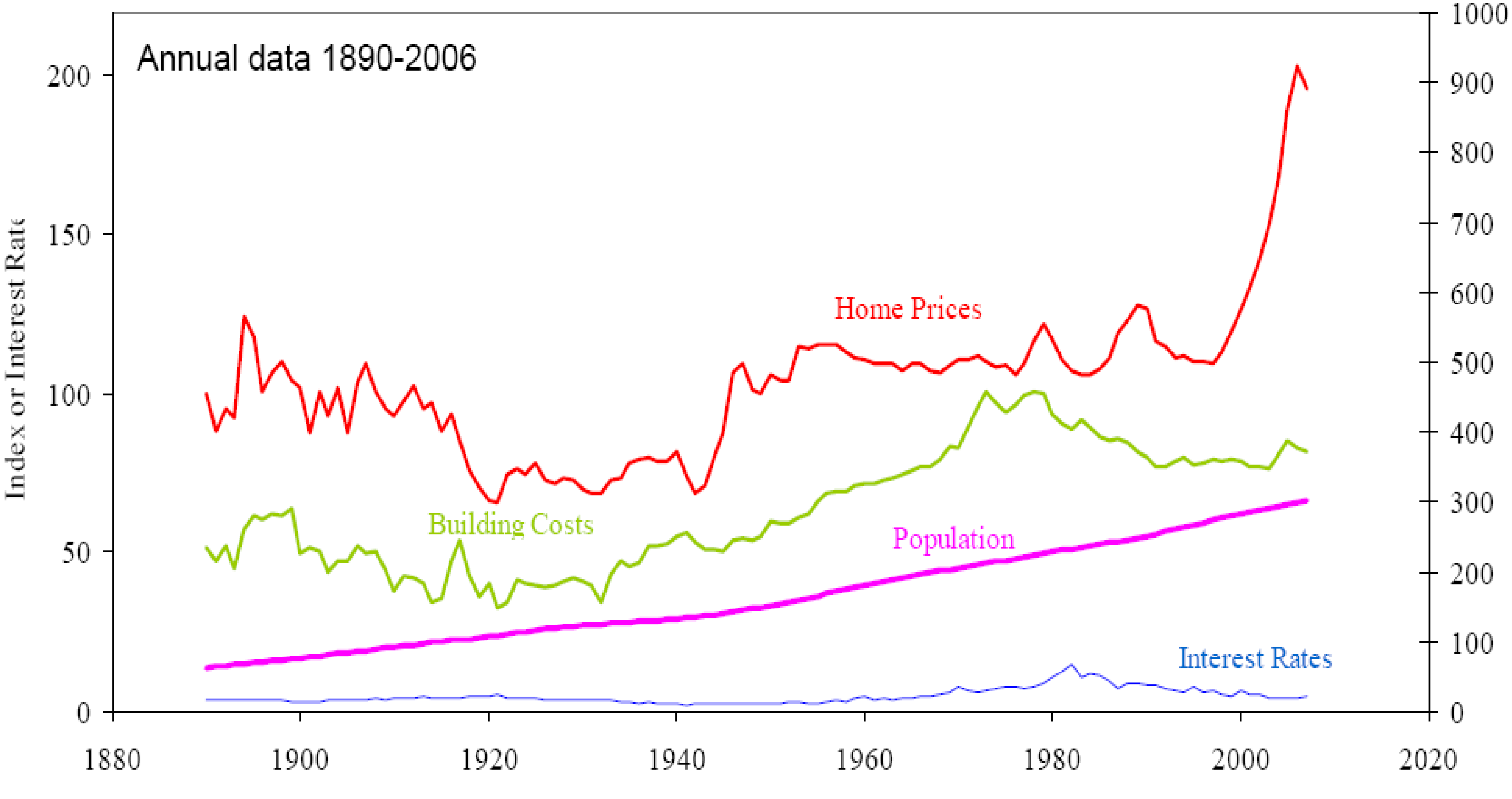
$$L^D < L^C < L^{RE}$$

The Crisis: where are we?

“Deleveraging”, “Quantitative Easing” and “Tapering”

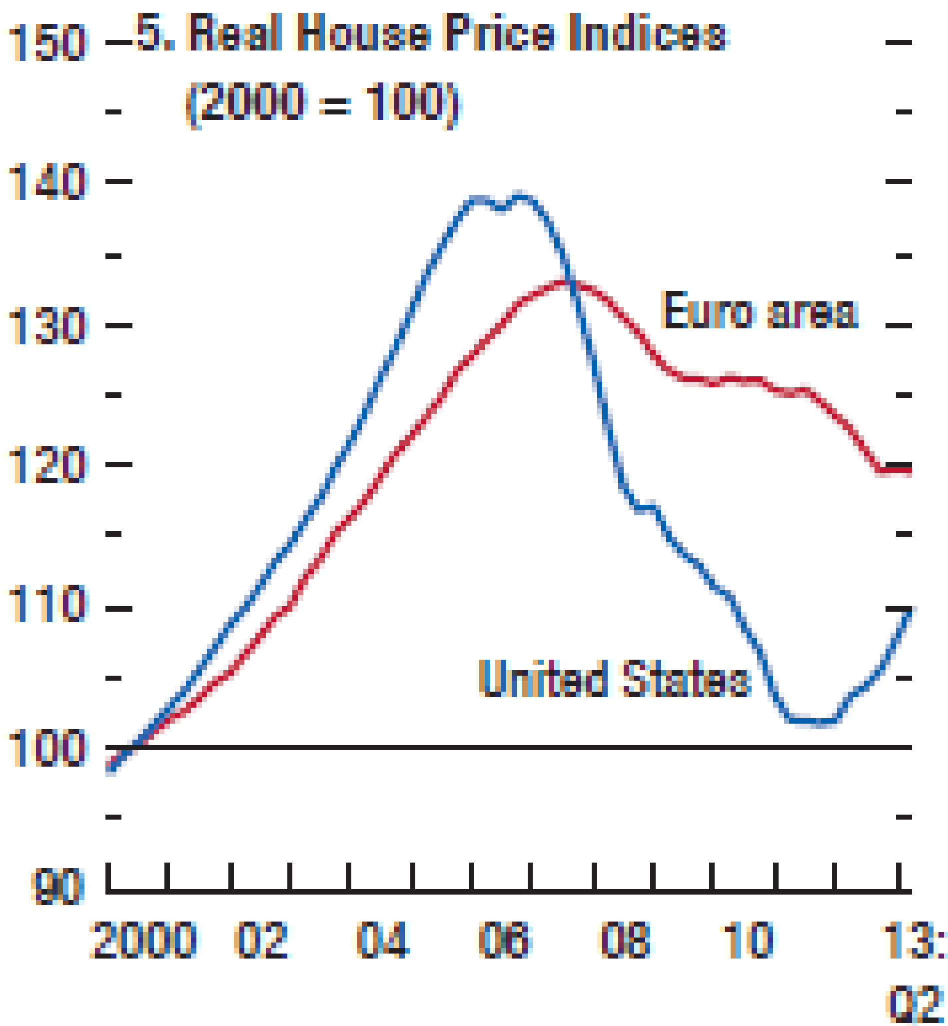
14.02 Spring 2014

United States: real house prices since 1880



Source: S&P, Case-Shiller Index

Real house prices (indeces, 2000=100)



Source: IMF, World Economic Outlook, October 2013

House prices and household debt (mortgages)

leverage = 10

house		debt and equity	
house	100	equity	10
		debt	90

leverage = 9,18

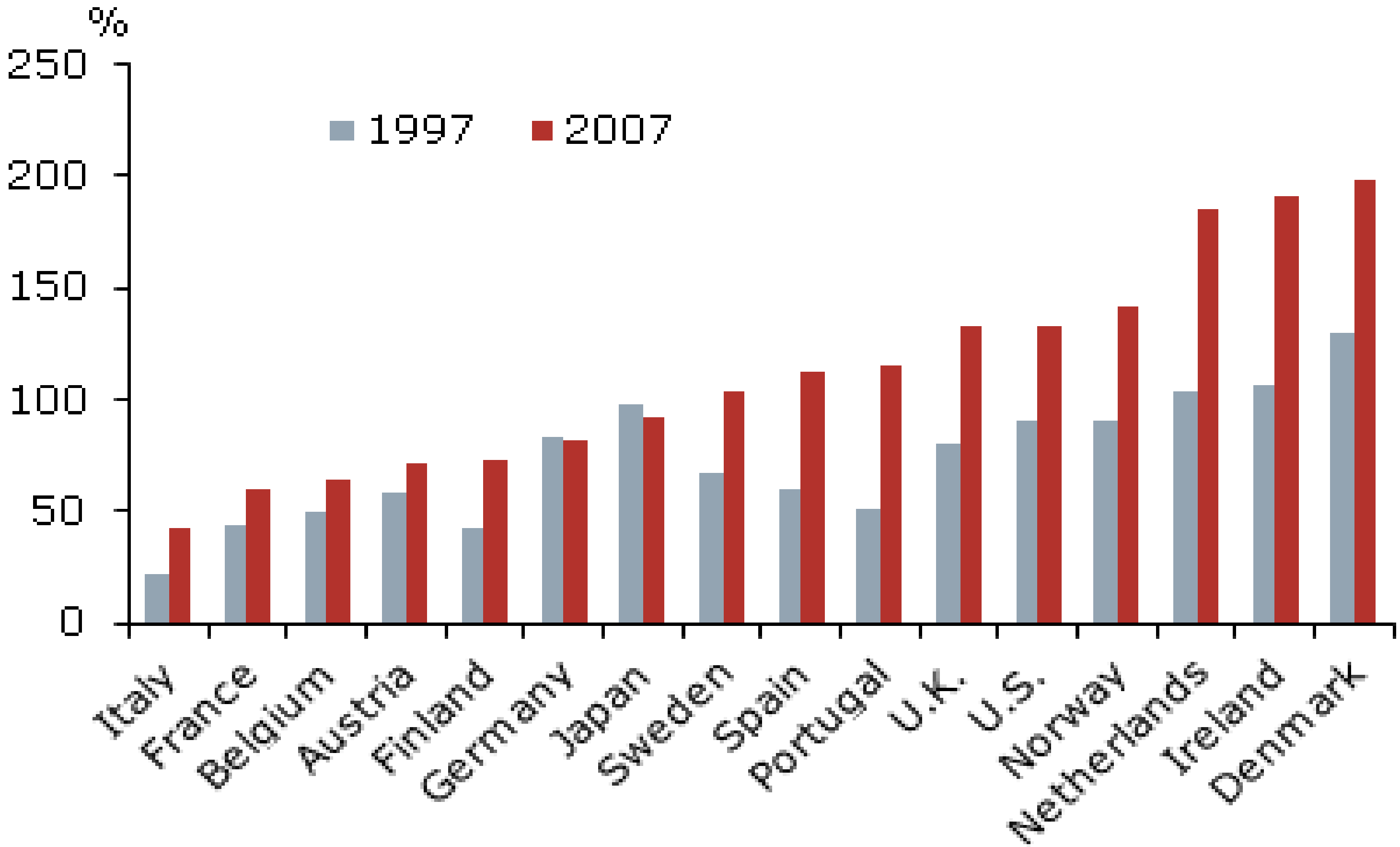
house		debt and equity	
house	101	equity	11
		debt	90

leverage = 10

house		debt and equity	
house	101	equity	11
cash	9	debt	99

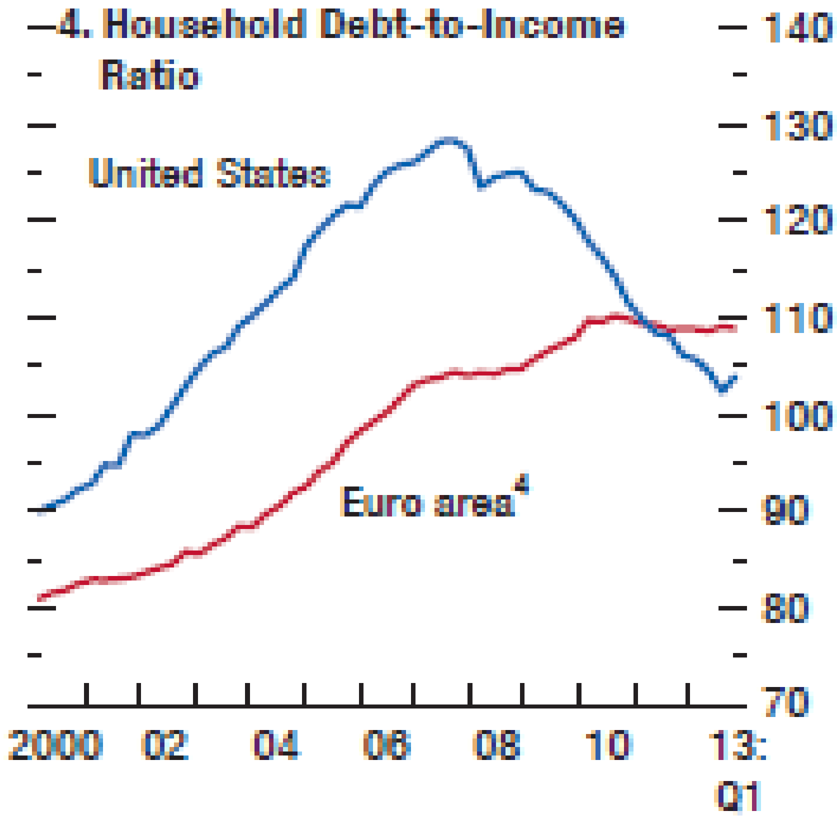
- The additional 9$ borrowed are spent
- Leverage and amplification
  - 1$ increase in house price
  - 9$ increase in spending

Households' leverage ratios: debt to disposable income



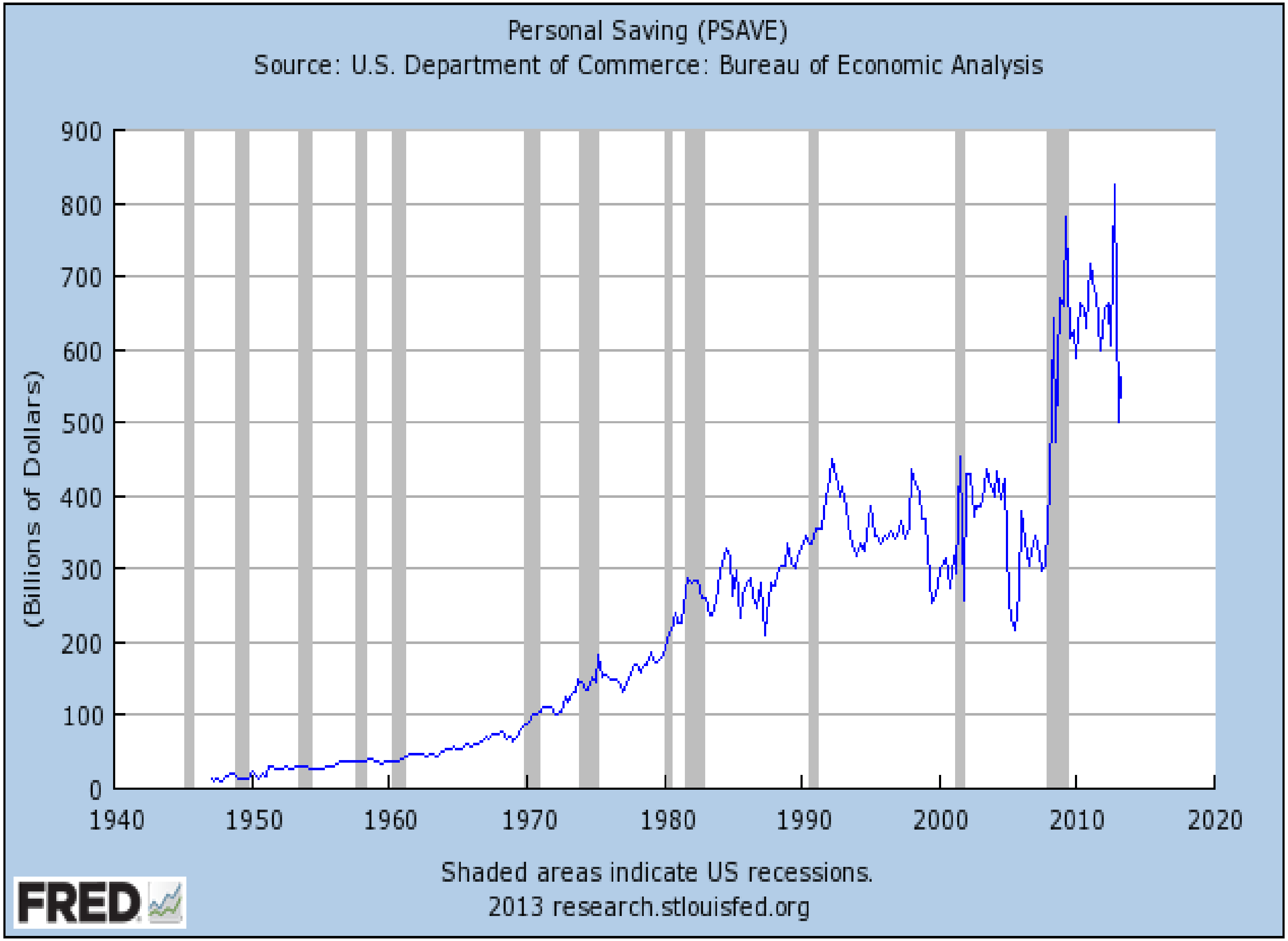
Source: IMF, World Economic Outlook, October 2008

House prices and household debt (mortgages)



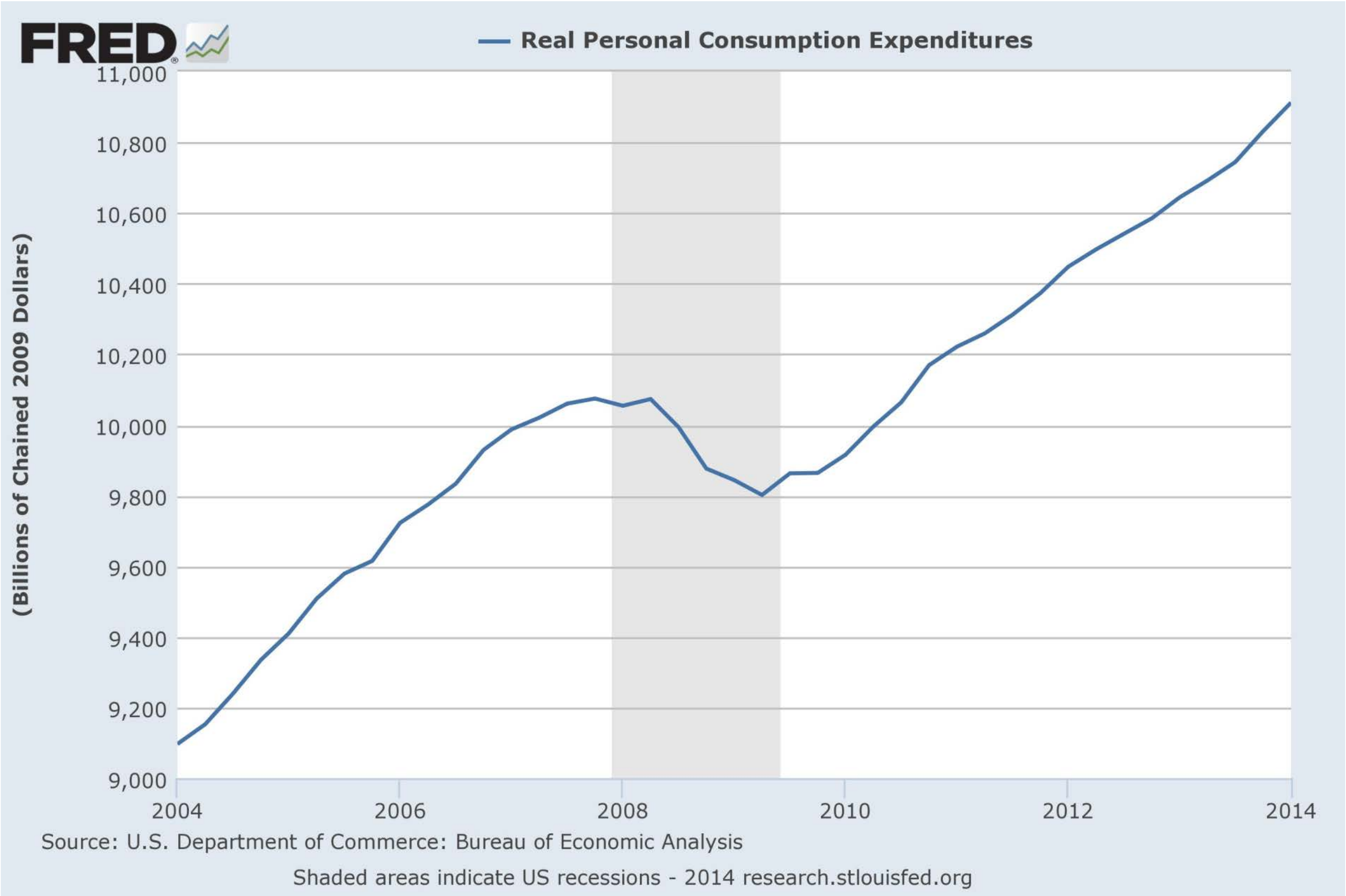
Source: IMF, World Economic Outlook, October 2013

Deleveraging: US Household saving
(percent of disposable income)



"Data Source: FRED, Federal Reserve Economic Data, Federal Reserve Bank of St. Louis: Personal Savings; U.S. Department of Commerce: Bureau of Economic Analysis; http://research.stlouisfed.org; accessed September 8, 2014."

Deleveraging: US Household consumption
(constant dollars)



"Data Source: FRED, Federal Reserve Economic Data, Federal Reserve Bank of St. Louis: US Household Consumption; U.S. Department of Commerce: Bureau of Economic Analysis; http://research.stlouisfed.org; accessed September 8, 2014."

The consequences of Banks' Deleveraging

Asset prices and banks' leverage

leverage = 10

assets		liabilities	
assets	100	capital	10
		liabilities	90

leverage = 19

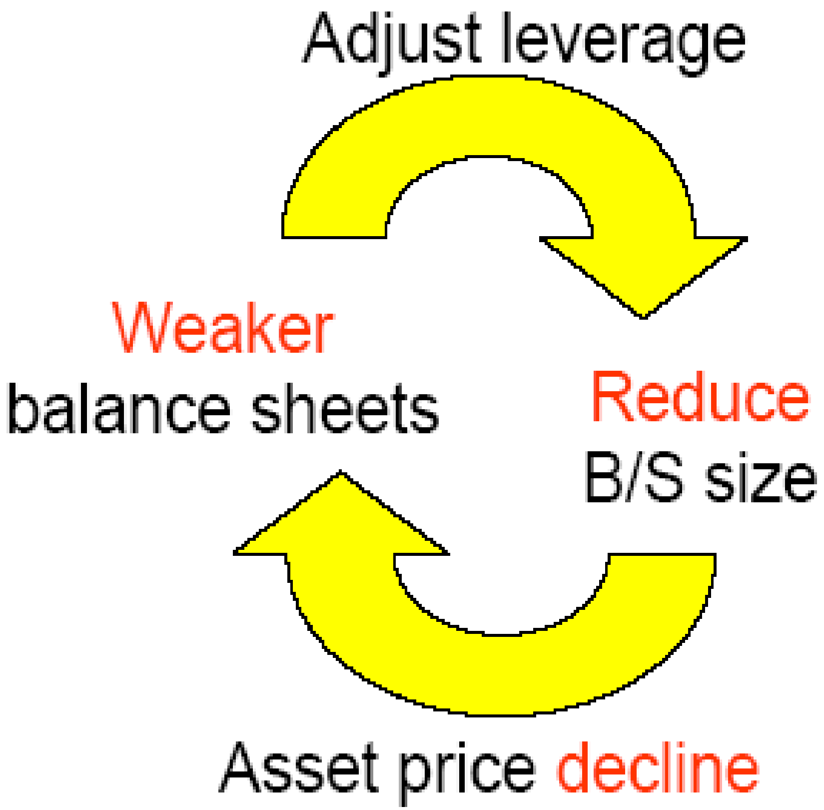
assets		liabilities	
assets	95	capital	5
		liabilities	90

leverage = 10

assets		liabilities	
assets	50	capital	5
		liabilities	45

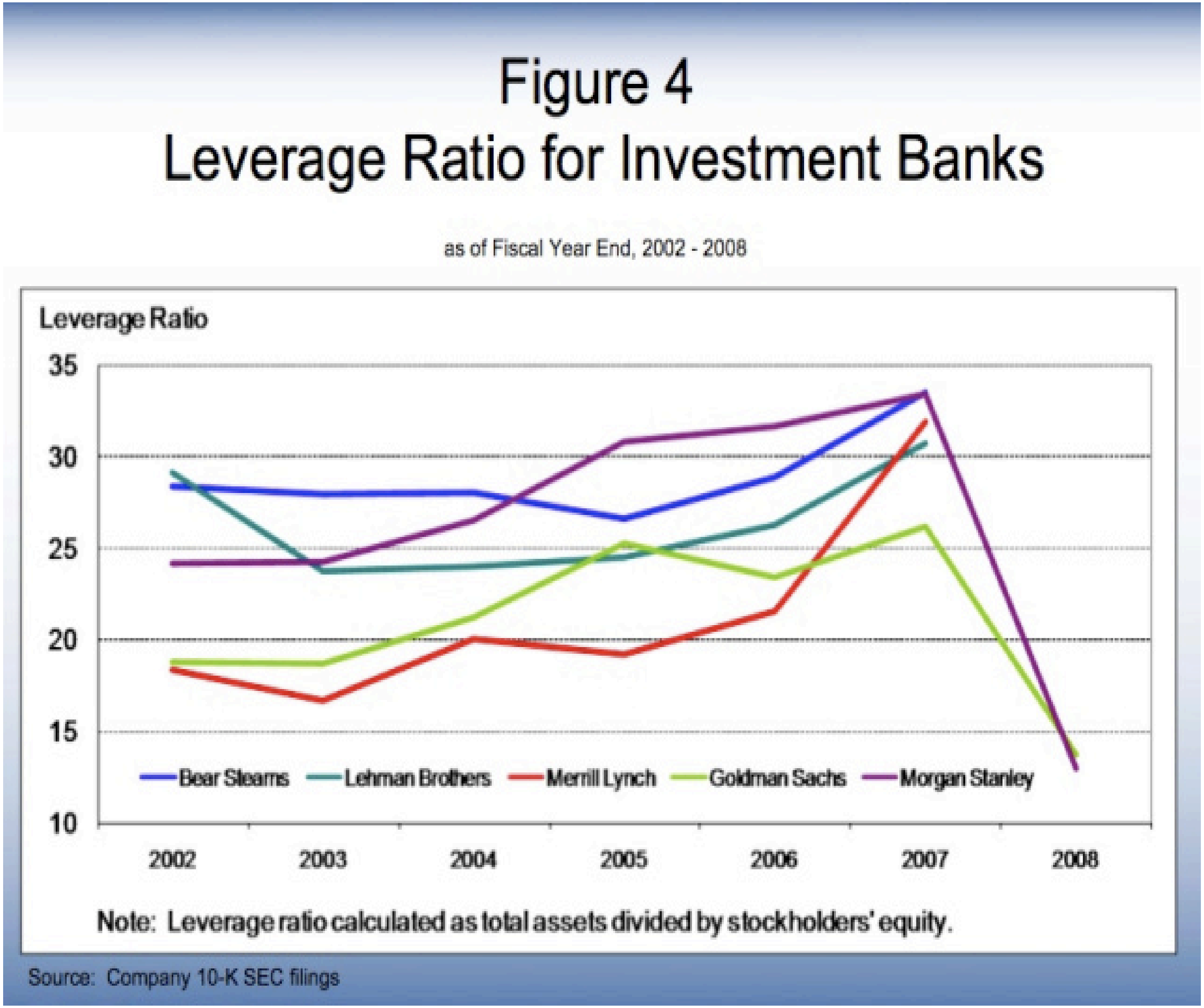
After a fall in asset values
banks sell asset:
Demand function slopes the wrong way !

The leverage cycle



12

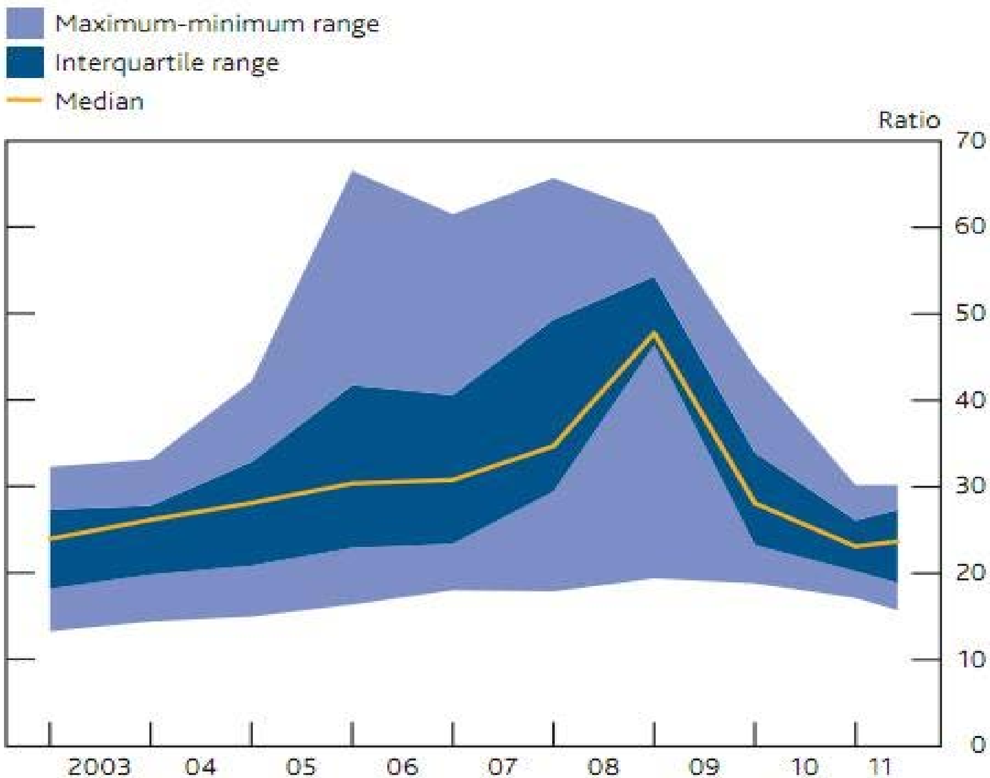
Banks deleveraging: an example



Courtesy of the Federal Reserve Bank of Boston. Used with permission.

Banks’ leverage and deleveraging

Chart 5.6 Major UK banks’ leverage ratios[a]



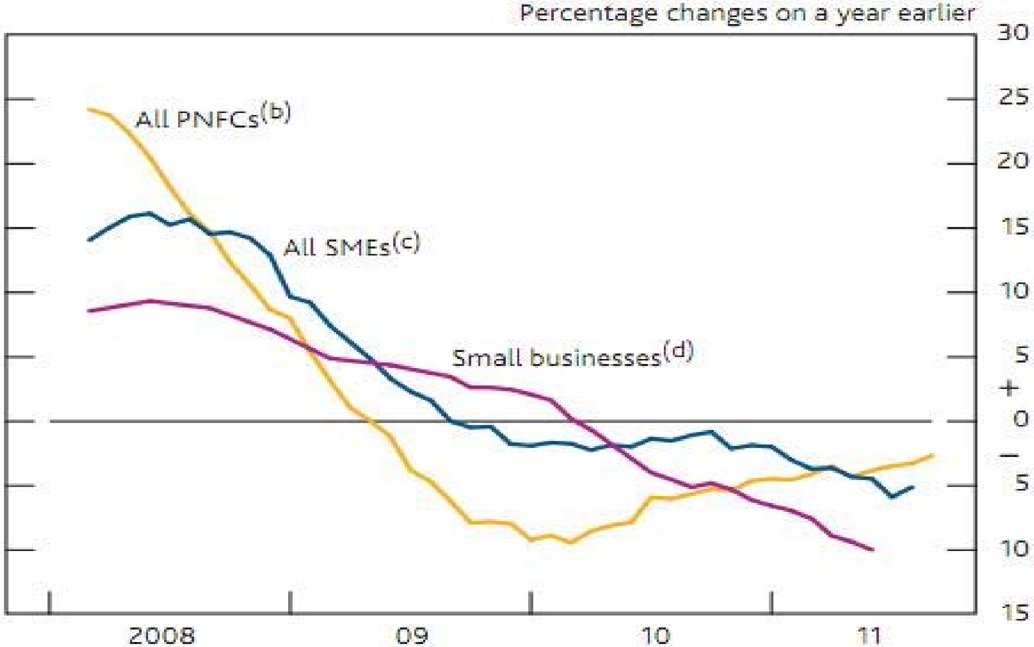
Sources: Published accounts and Bank calculations.

(a) For explanatory notes see Chart 2.4.

Source: Bank of England

Bank deleveraging and bank lending to firms

Chart 5.12 Lending to UK businesses by size[a]

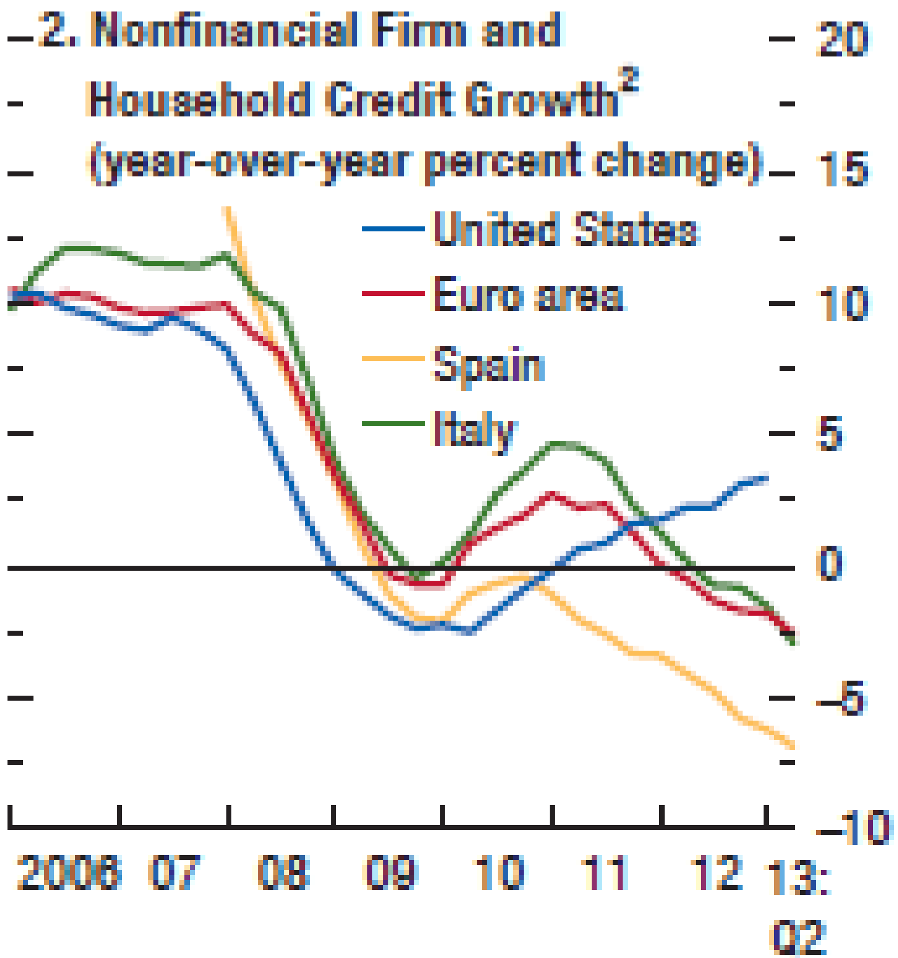


Sources: Bank of England, British Bankers' Association (BBA), Department for Business, Innovation and Skills (BIS) and Bank calculations.

(a) Rate of growth in the stock of loans. Data are non seasonally adjusted.
(b) Data cover both sterling and foreign currency loans. The latest observation is September 2011.
(c) BIS data and Bank calculations. Stock of sterling and foreign currency lending, expressed in sterling terms, by four UK lenders to enterprises with an annual bank account debit turnover of less than £25 million. The latest observation is August 2011.
(d) BBA data. Stock of sterling lending by seven UK lenders to commercial businesses with an annual bank account debit turnover of up to £1 million. Data are quarterly until September 2009 and monthly thereafter. The last observation is June 2011: www.bba.org.uk/statistics/article/small-business-support-december-2010/small-business/.

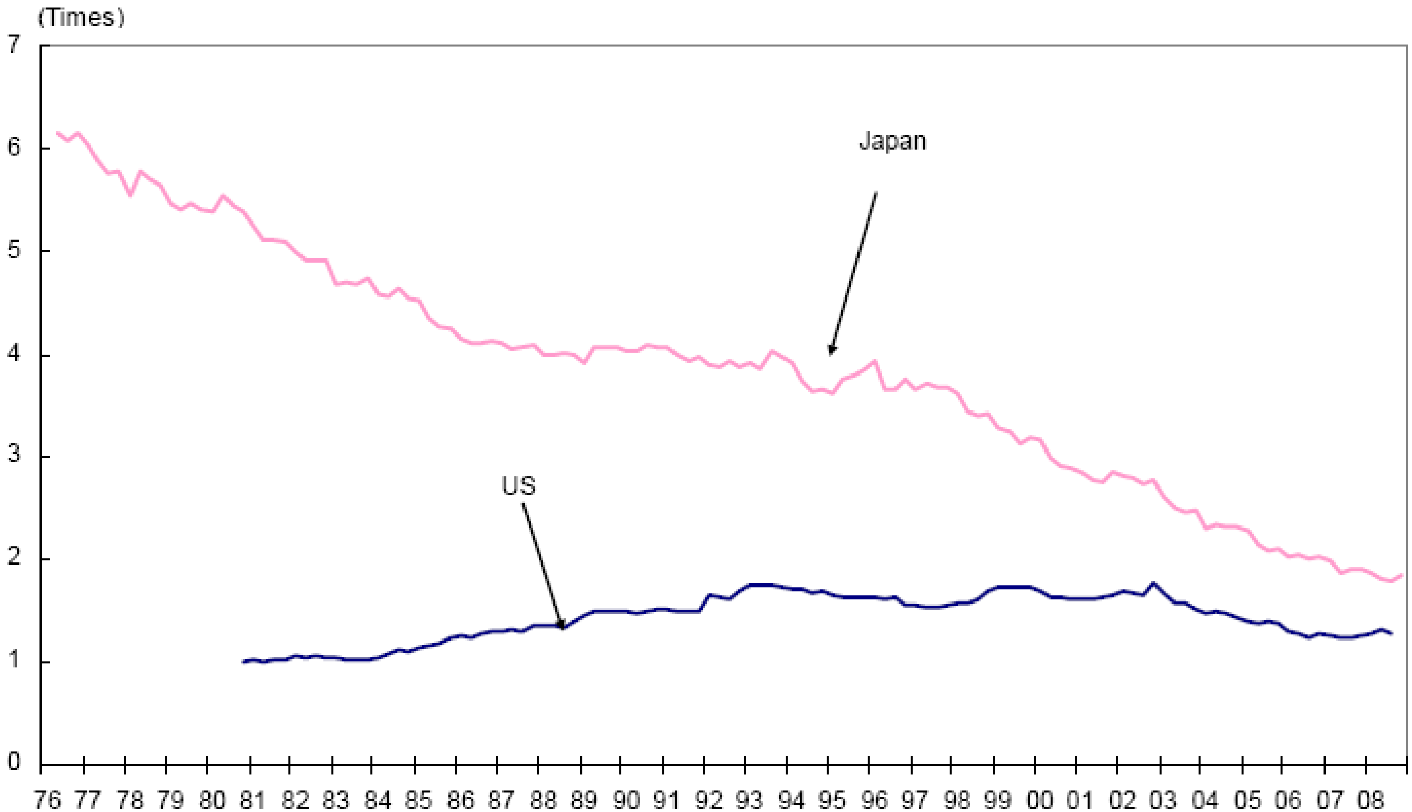
Source: Bank of England

Bank deleveraging and bank lending to households and firms



Source: IMF, World Economic Outlook, October 2013

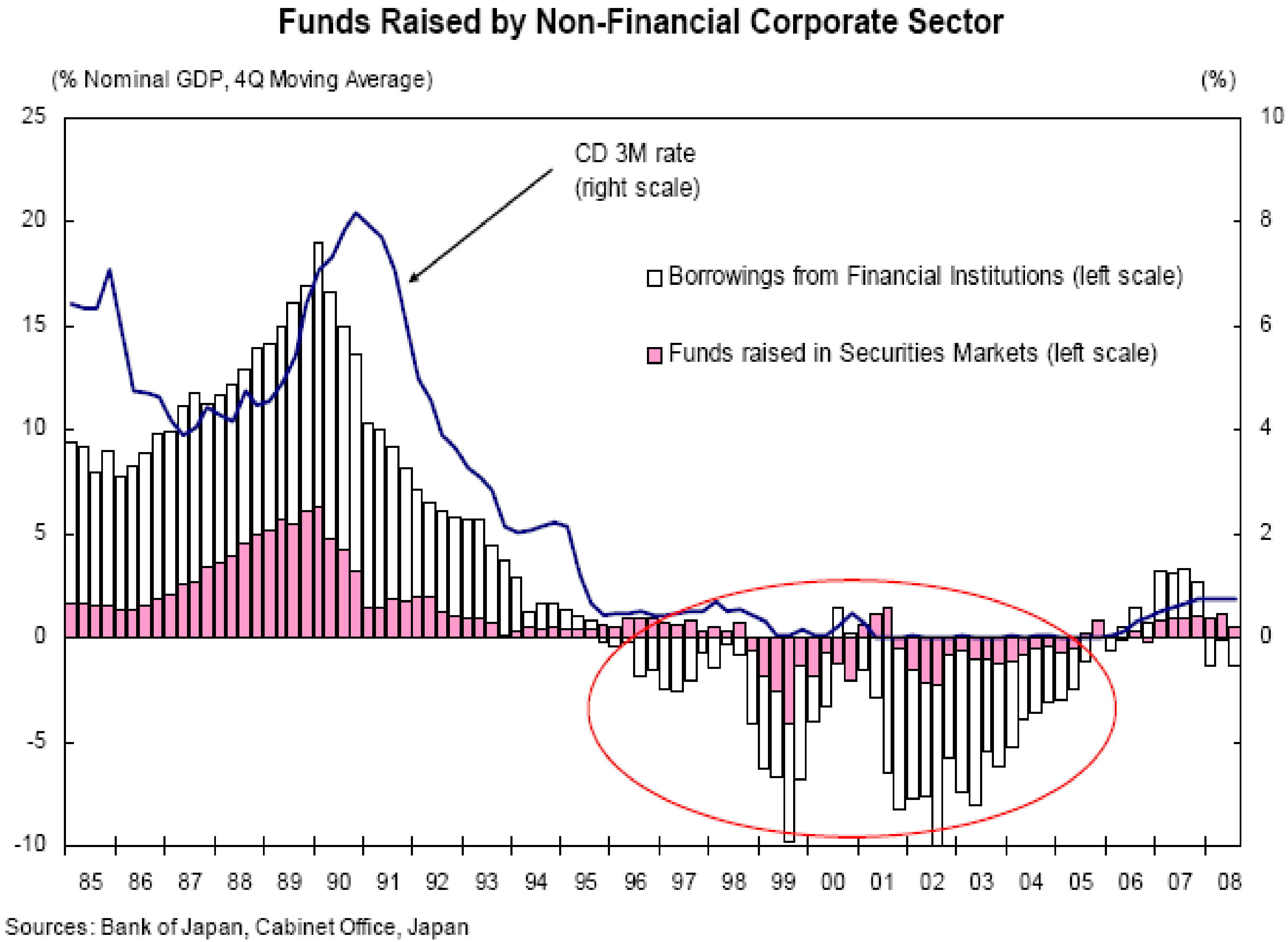
How long does a deleveraging cycle last ?
Japan: leverage of non financial corporations (1976 – 2010)



Sources: Ministry of Finance, Japan, US Depertment of Commerce

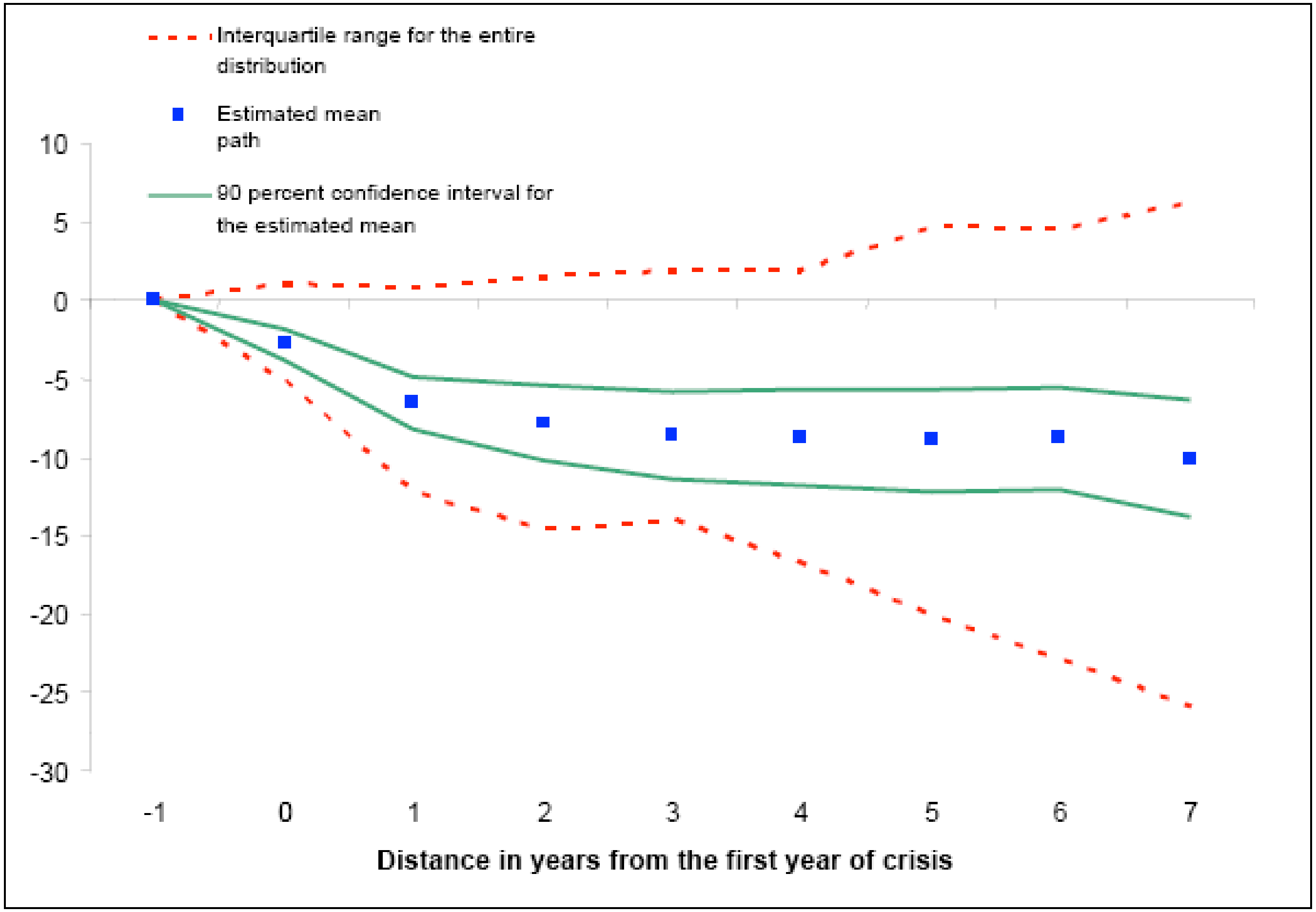
Source: Koo, 2008

Reducing leverage: Japan 1990 - 2010



Per-capita income after a banking crisis

average of 88 episodes

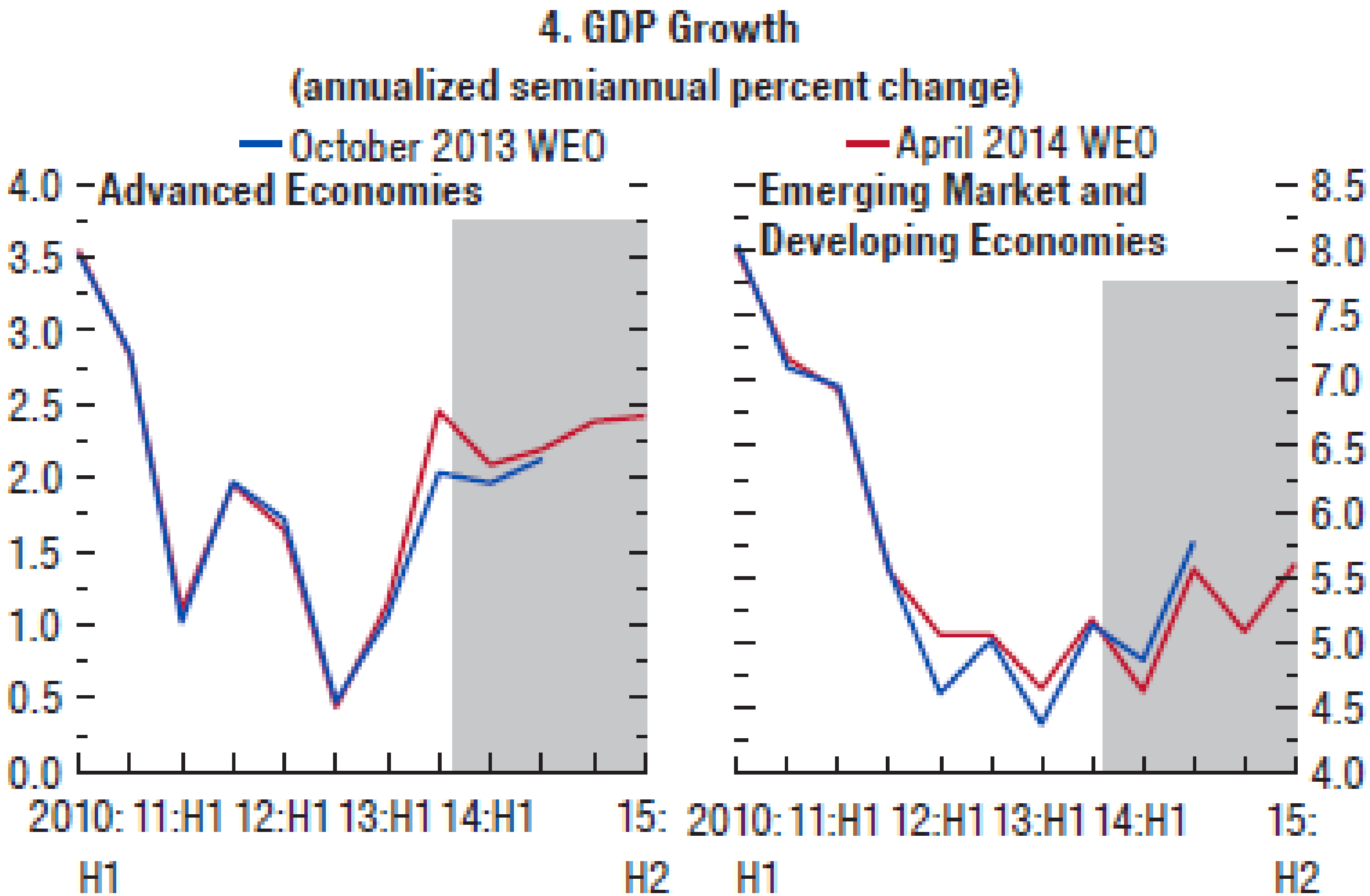


Source: IMF, World Economic Outlook, October 2009

Macroeconomics

how it responded to the crisis and the challenges today

World Output Growth

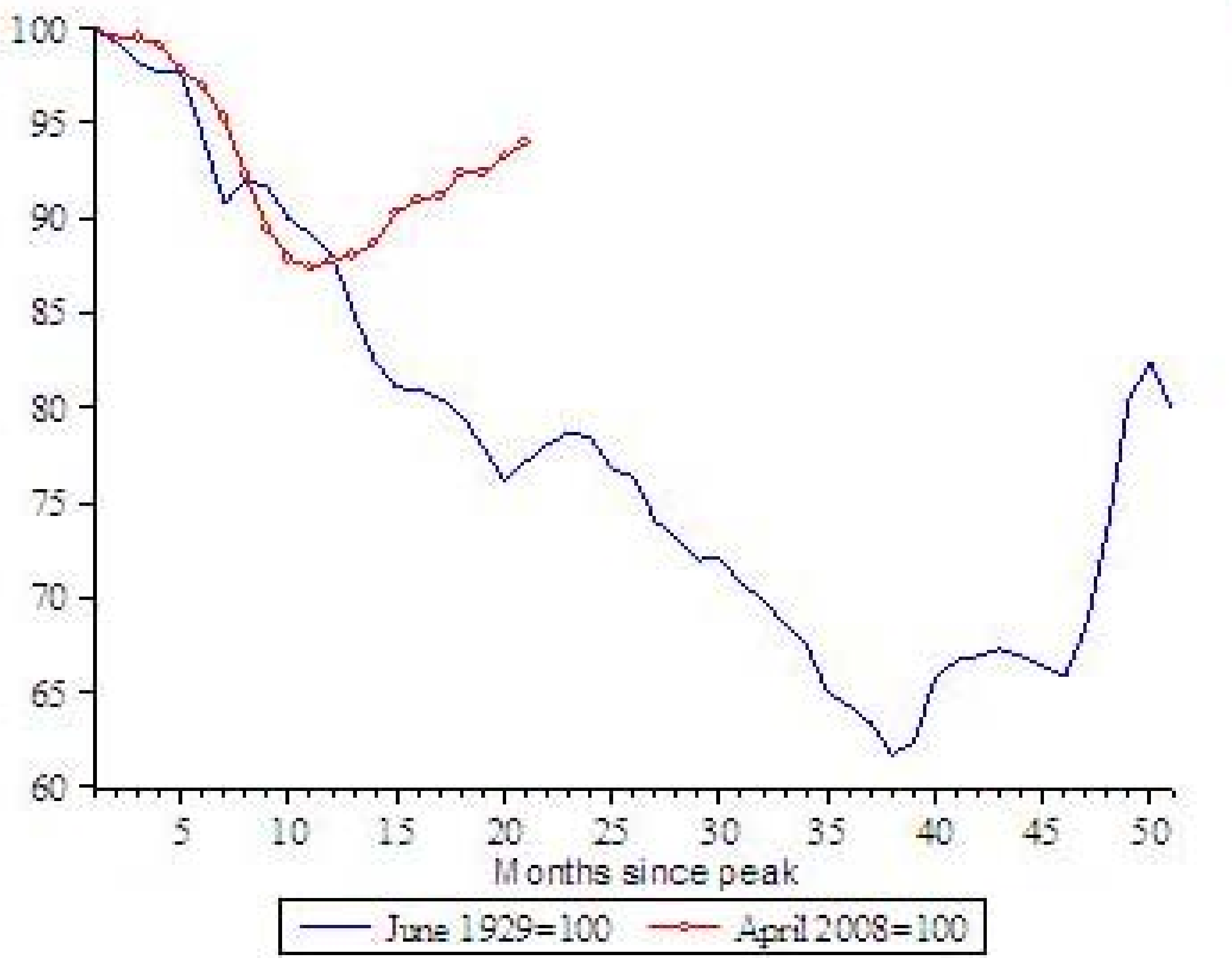


Source: IMF, World Economic Outlook, April 2014

How did monetary and fiscal policy respond ?

However they responded, it worked !

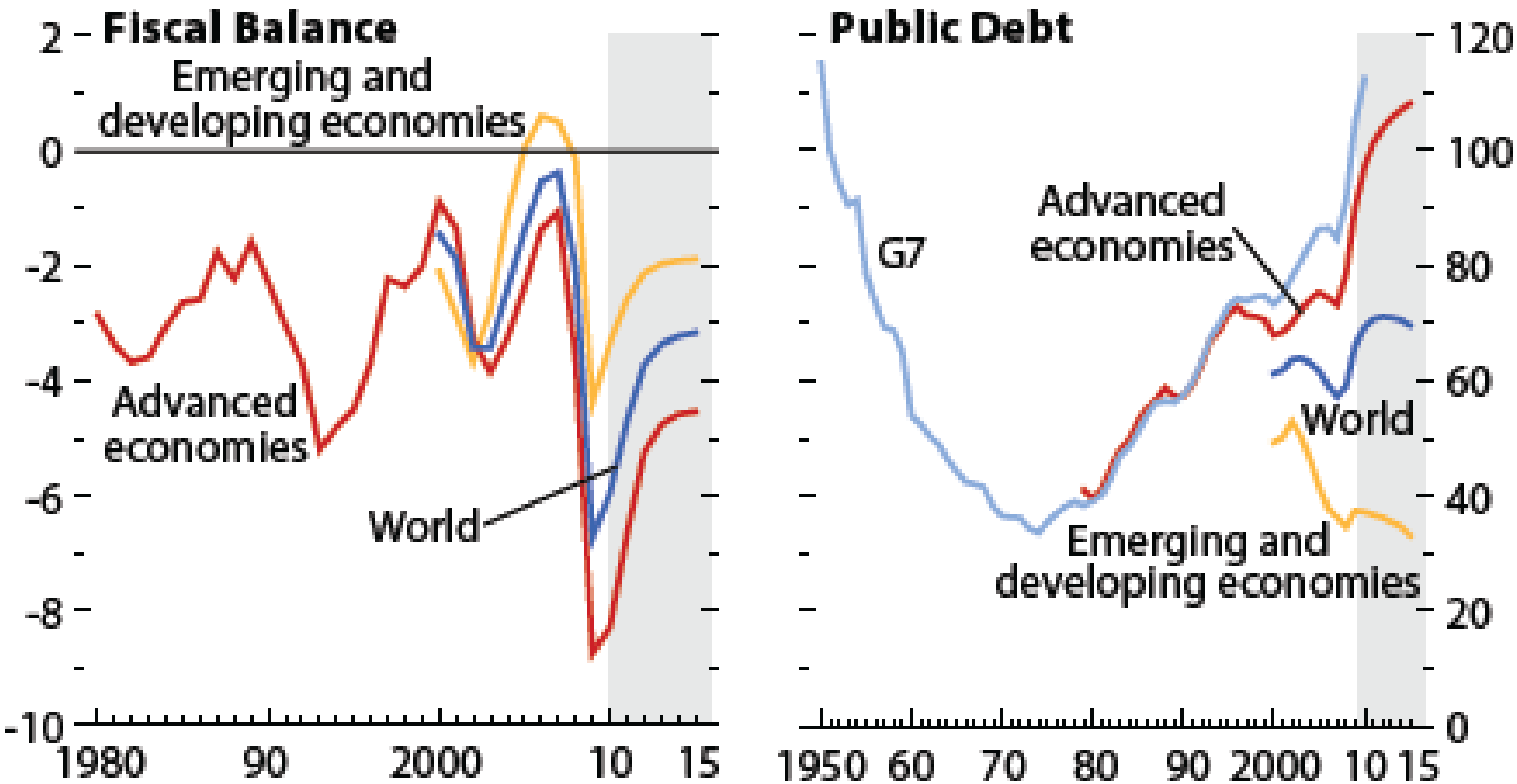
This crisis and the Great Depression in the 1930s



Courtesy of Barry Eichengreen and Kevin Hjortshøj O'Rourke. Used with permission.

Source: Eichengreen and O'Rourke, Vox-EU, March 2010

Fiscal policy



Source: IMF, World Economic Outlook

US Federal Government debt (percent GDP, 1940-2013)

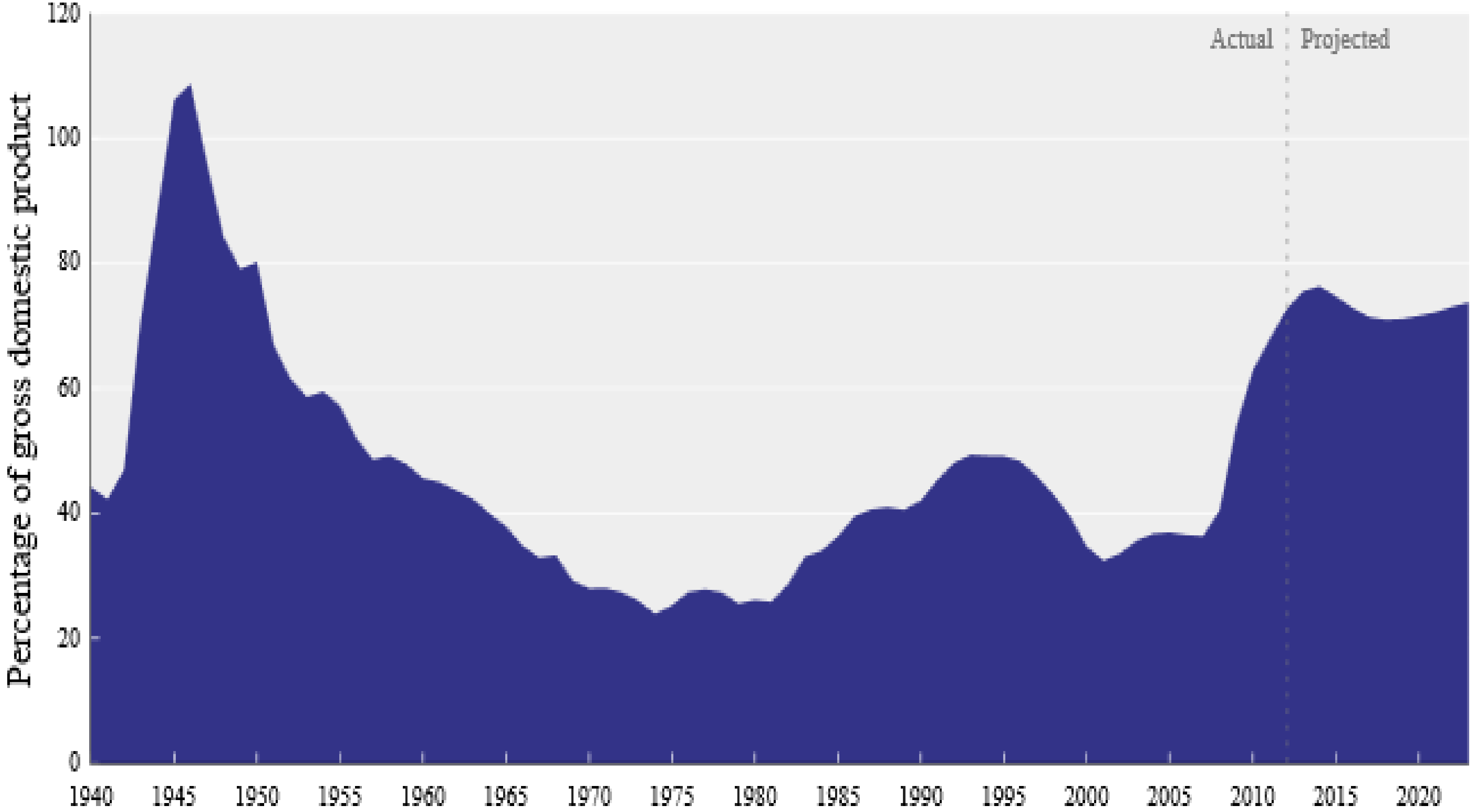
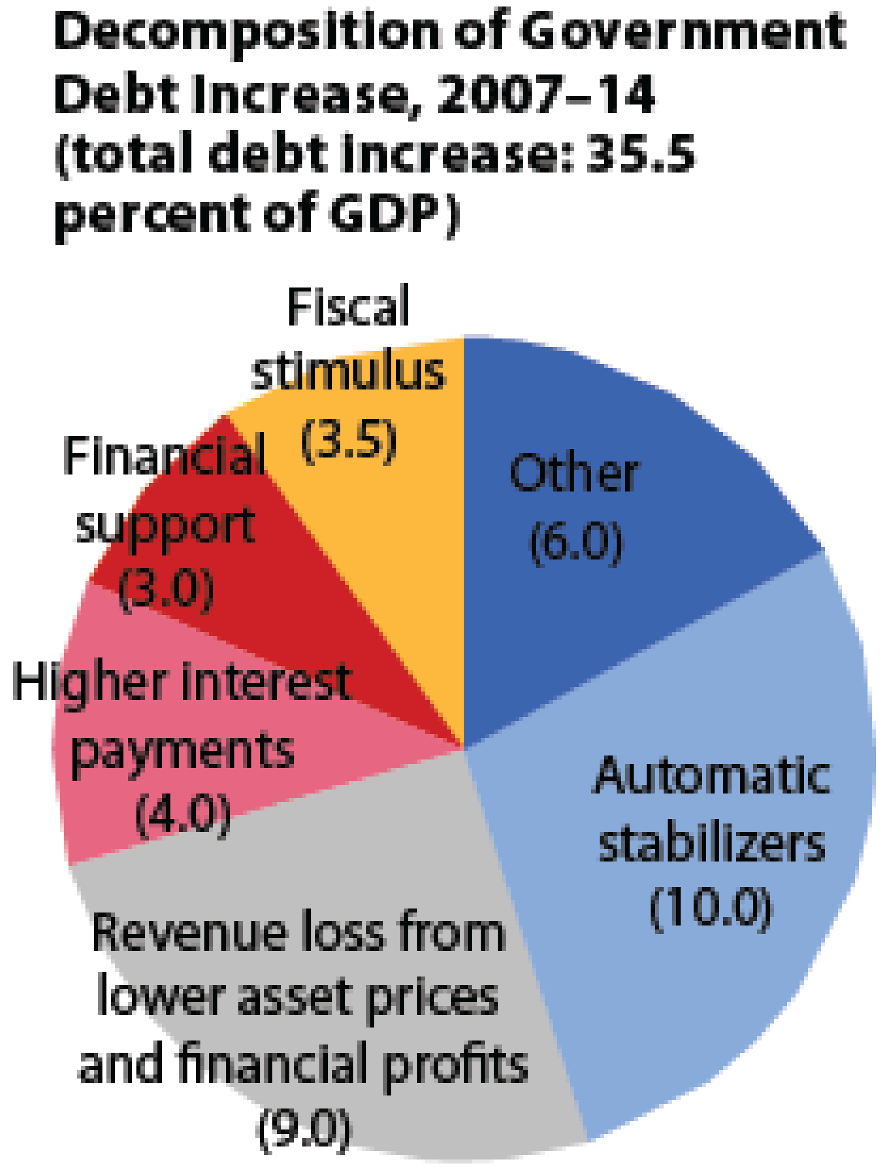
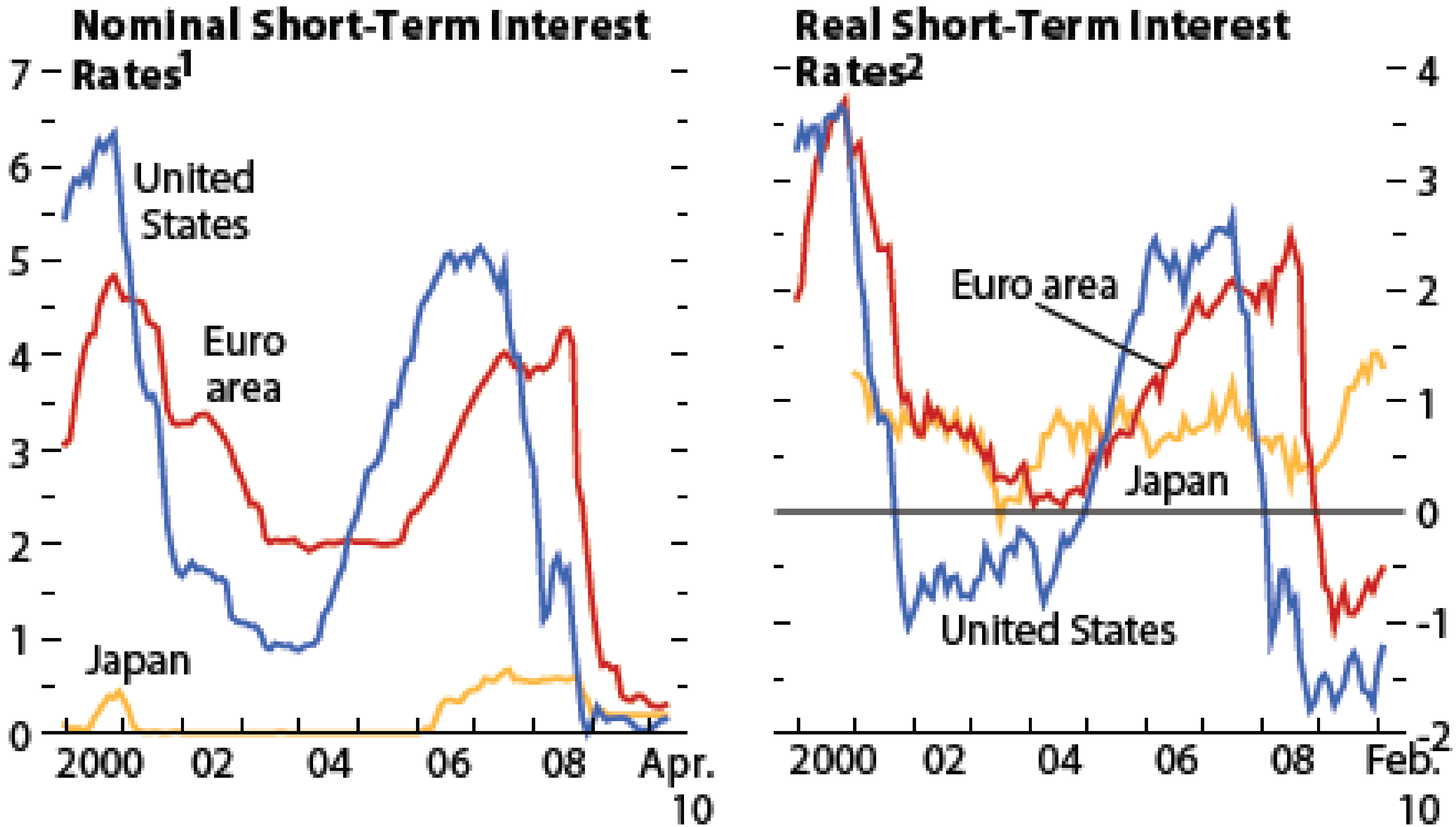


Image is in the public domain courtesy of the Congressional Budget Office.

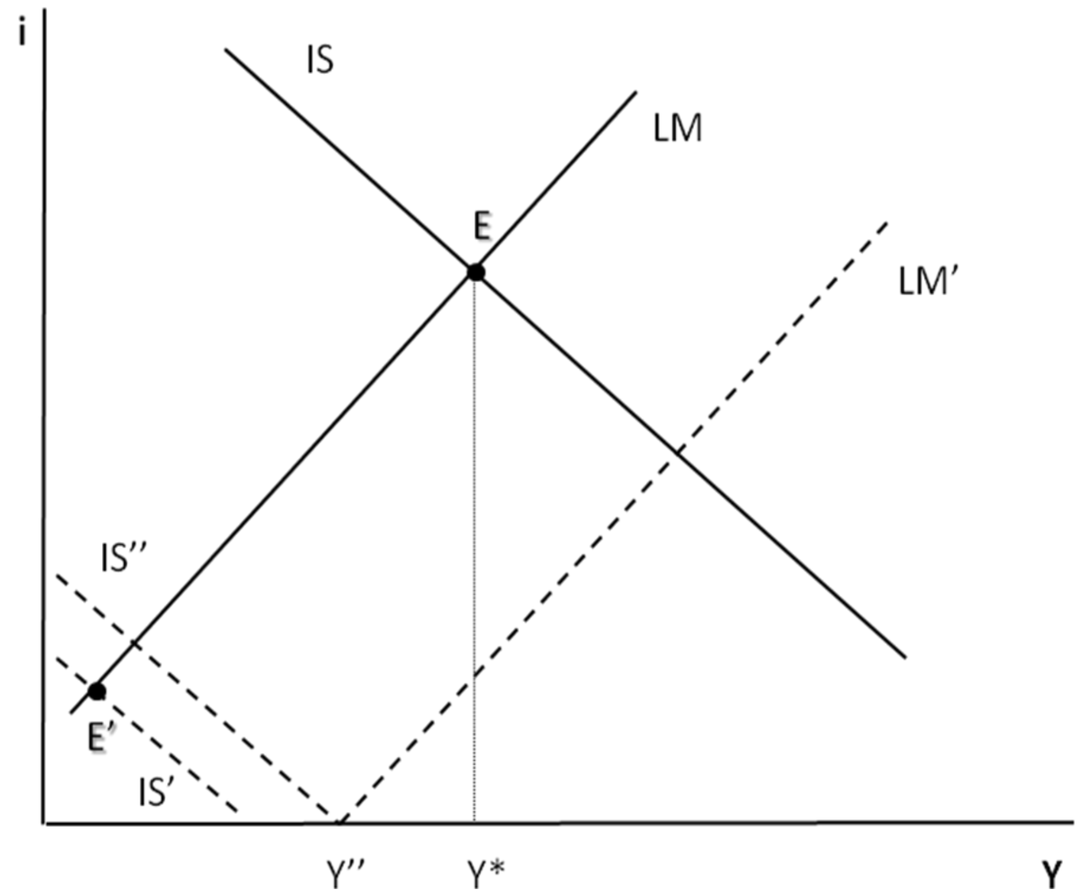

Decomposition of Government Debt Increase, 2007–14 (total debt increase: 35.5 percent of GDP)
Fiscal stimulus (3.5)
Financial support (3.0)
Other (6.0)
Higher interest payments (4.0)
Automatic stabilizers (10.0)
Revenue loss from lower asset prices and financial profits (9.0)

Monetary policy



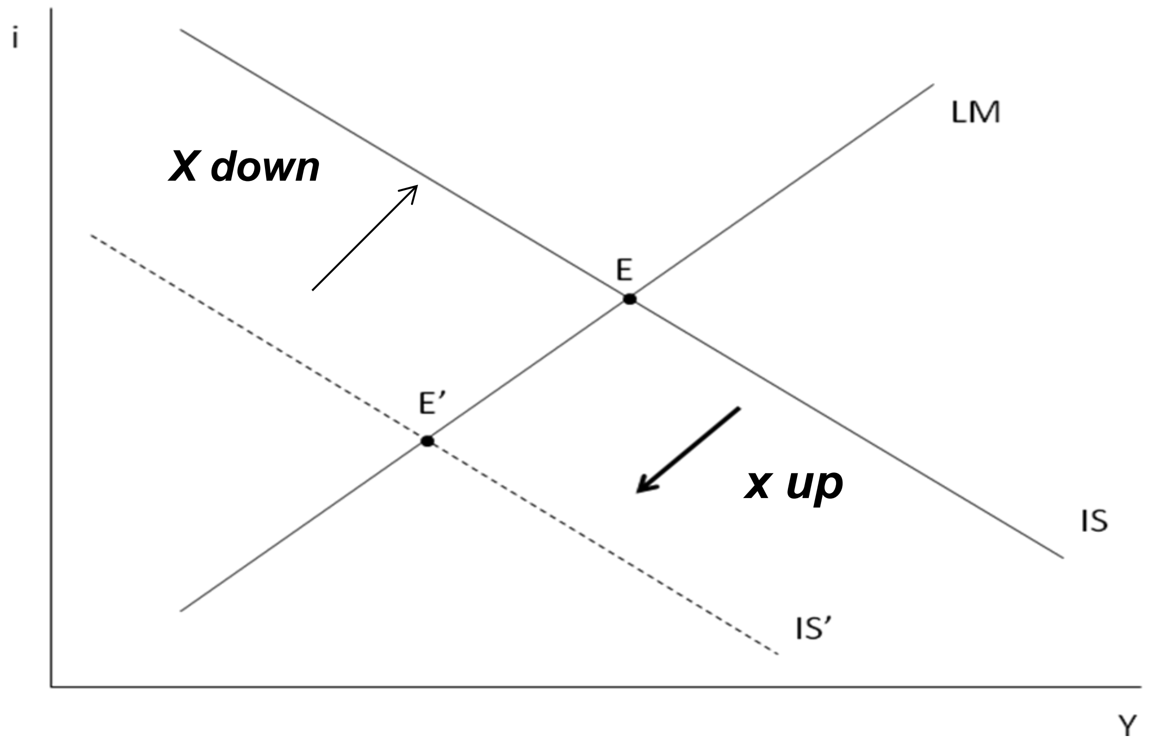
Zero Lower Bound: the “*Liquidity Trap*”

- Spending shock shifts IS to IS ‘
- Monetary policy response shfts LM to LM ‘
- Zero Lower Bound
- Central bank buys asset, prints money: Quantitative Easing
- IS ‘ shifts up to IS ‘’



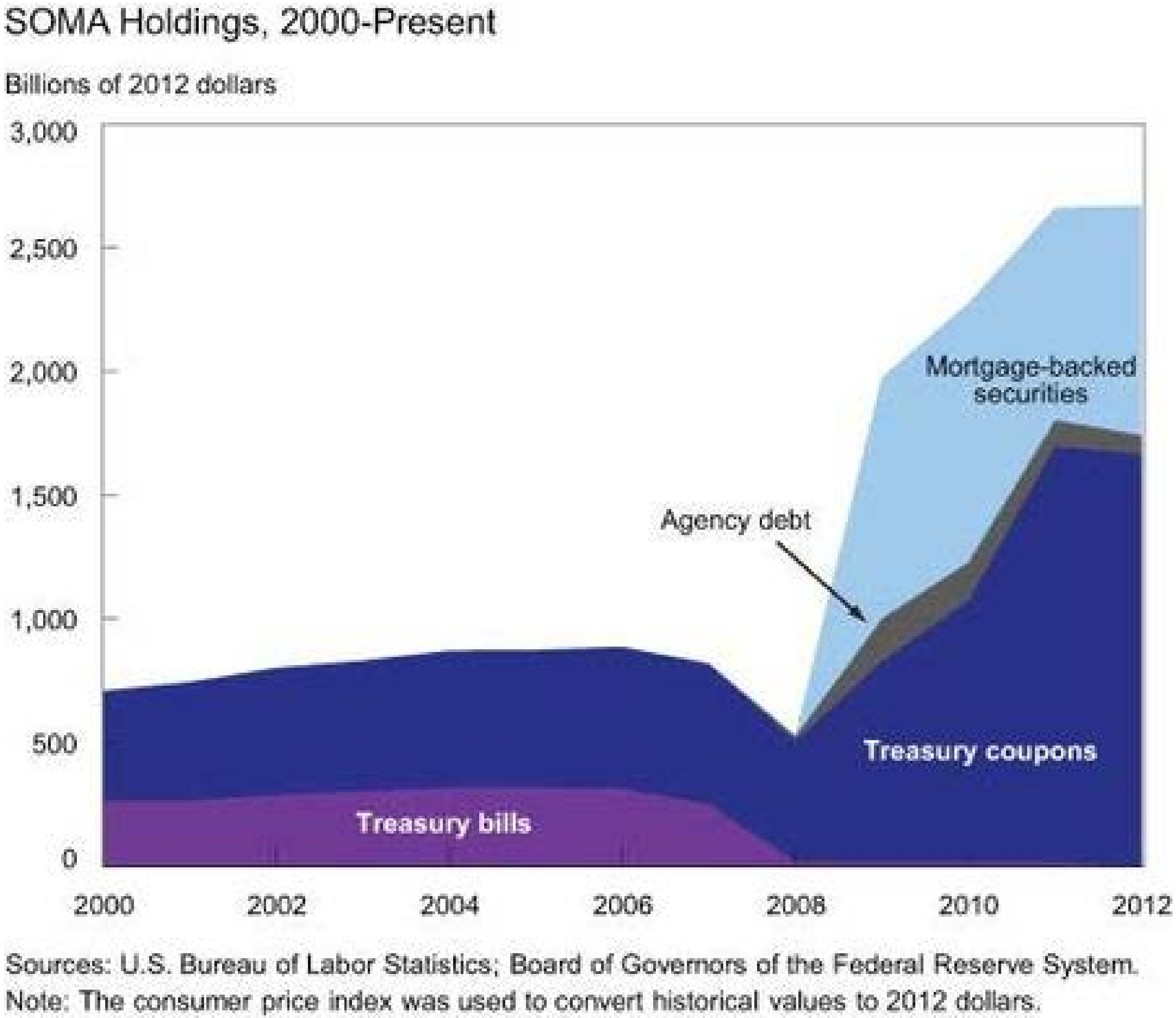
Quantitative Easing and the Holmstrom-Tirole model

- *$\rho = i + x$: interest rate at which firms can borrow*
- *Investment = $I(Y, \rho)$*
- *Crisis reduces banks' capital (slide 11)*
  - *$x = f$ (capital of banks and own resources of entrepreneurs, A)* ↑
    - *for given* i, *Investment* ↓
  - *Quantitative Easing raises banks' capital x* ↓
    - *For given i, Investment* ↑



The «asset side» of the Federal Reserve's balance sheet,before the crsis

The «asset side» of the Federal Reserve's balance sheet, today



Quantitative easing

before Central Bank

assets		liabilities	
Gvt bills	100	cash	80
		bank reserves	20

Commercial Bank

assets		liabilities	
Loans	50		
Mortgage backed securities	30	deposits	90
Reserves at the CB	20	equity	10

after

assets		liabilities	
Gvt bills	100	cash	80
Mortgage backed securities	30	bank reserves	50

assets		liabilities	
Loans	50		
Mortgage backed securities	0	deposits	90
Reserves at the CB	50	equity	10

Quantitative easing and Credit easing

https://www.khanacademy.org/economics-finance-domain/core-finance/money-and-banking/federal-reserve/v/more-on-quantitative-easing--and-credit-easing

Fed «Tapering» and its consequences